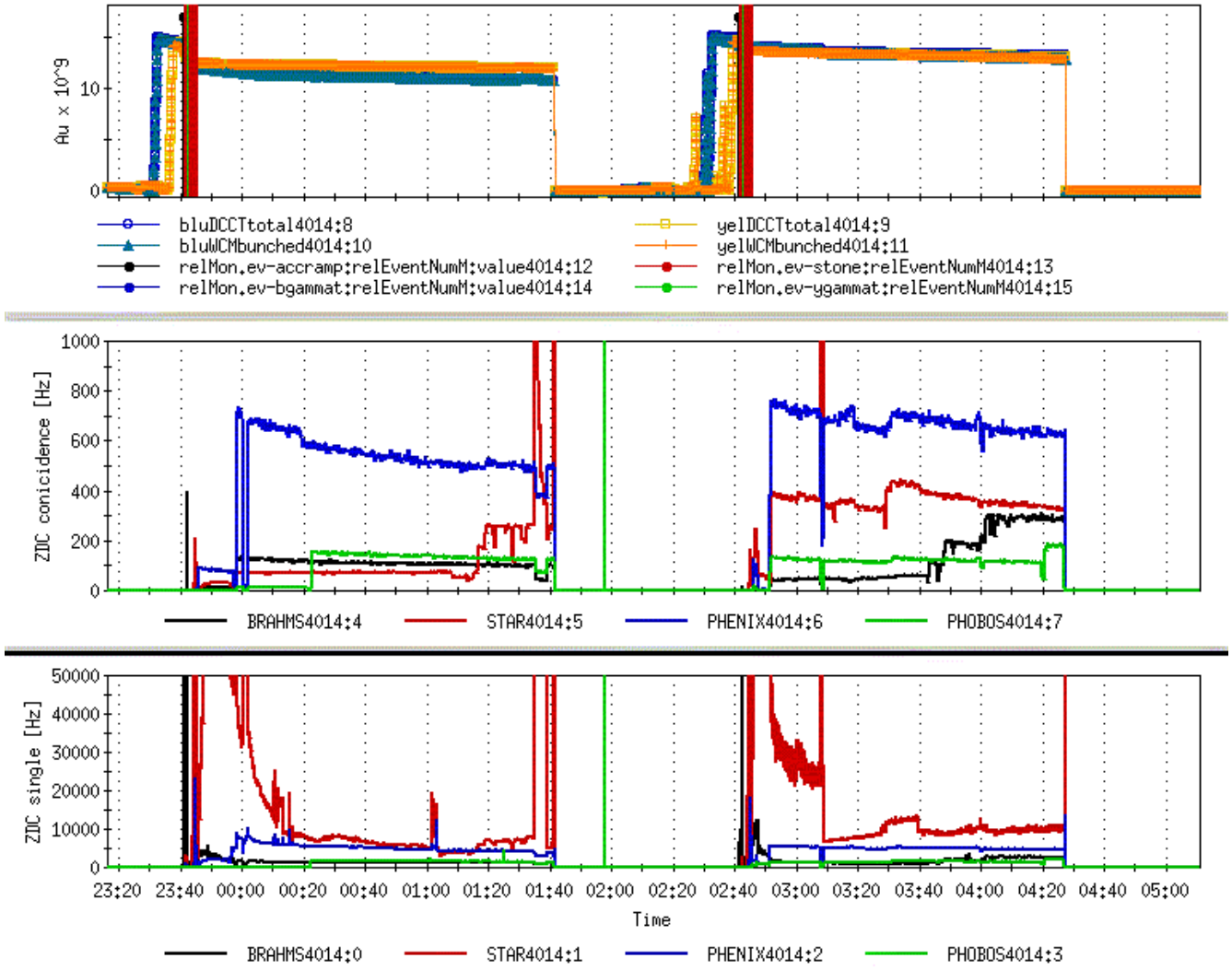
Finished set-up period, entered ramp-up period

- machine development during 2 day shifts
- some luminosity for experiments during owl shift



- 2 stores last night
- still low rates
  (<1kHz from 56 bunches, 0.25e9/bunch)
- will test new bunch patterns

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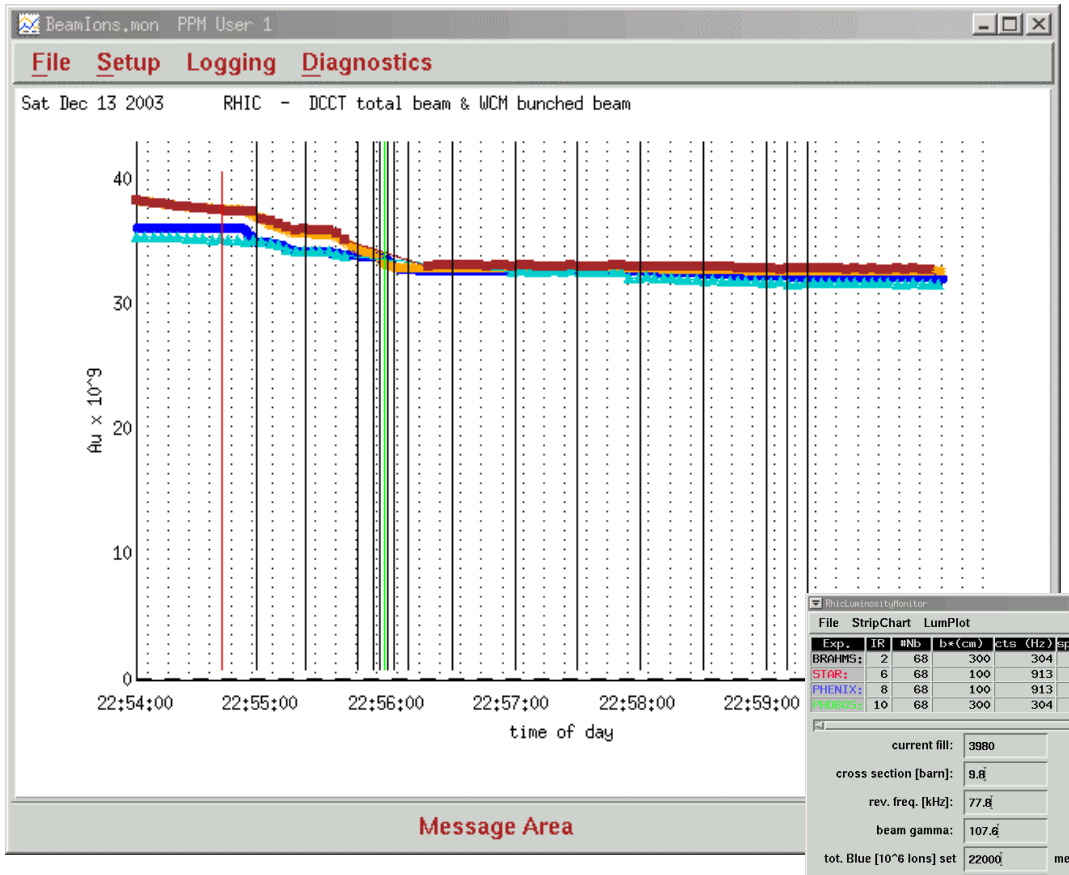
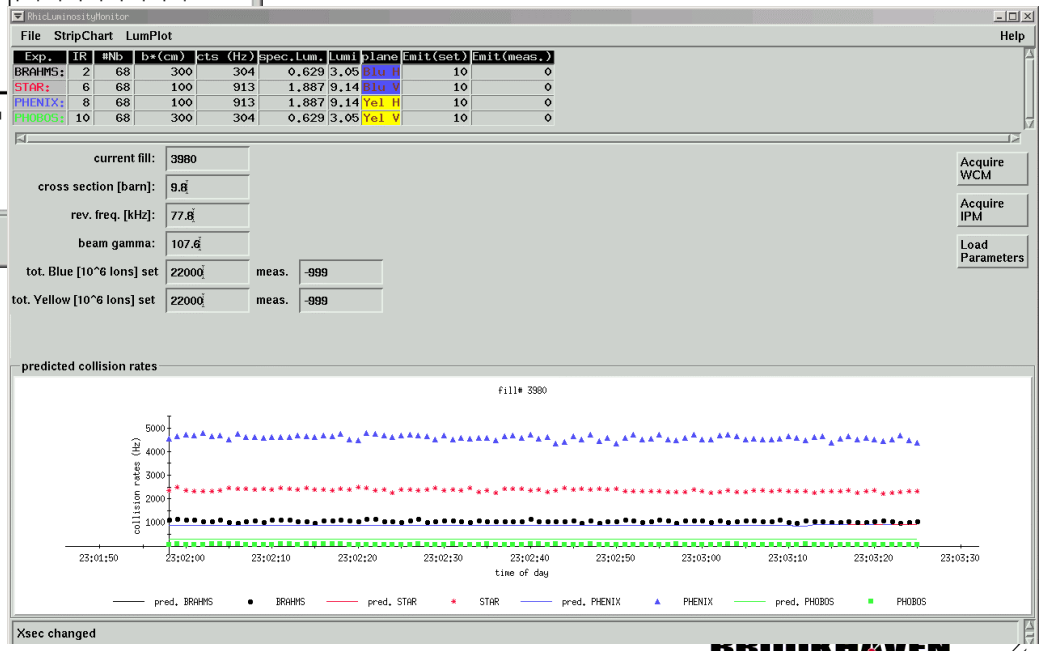


Record store so far Run-4:
68x68 bunches (new pattern)
0.5e9/bunch



Progress made:

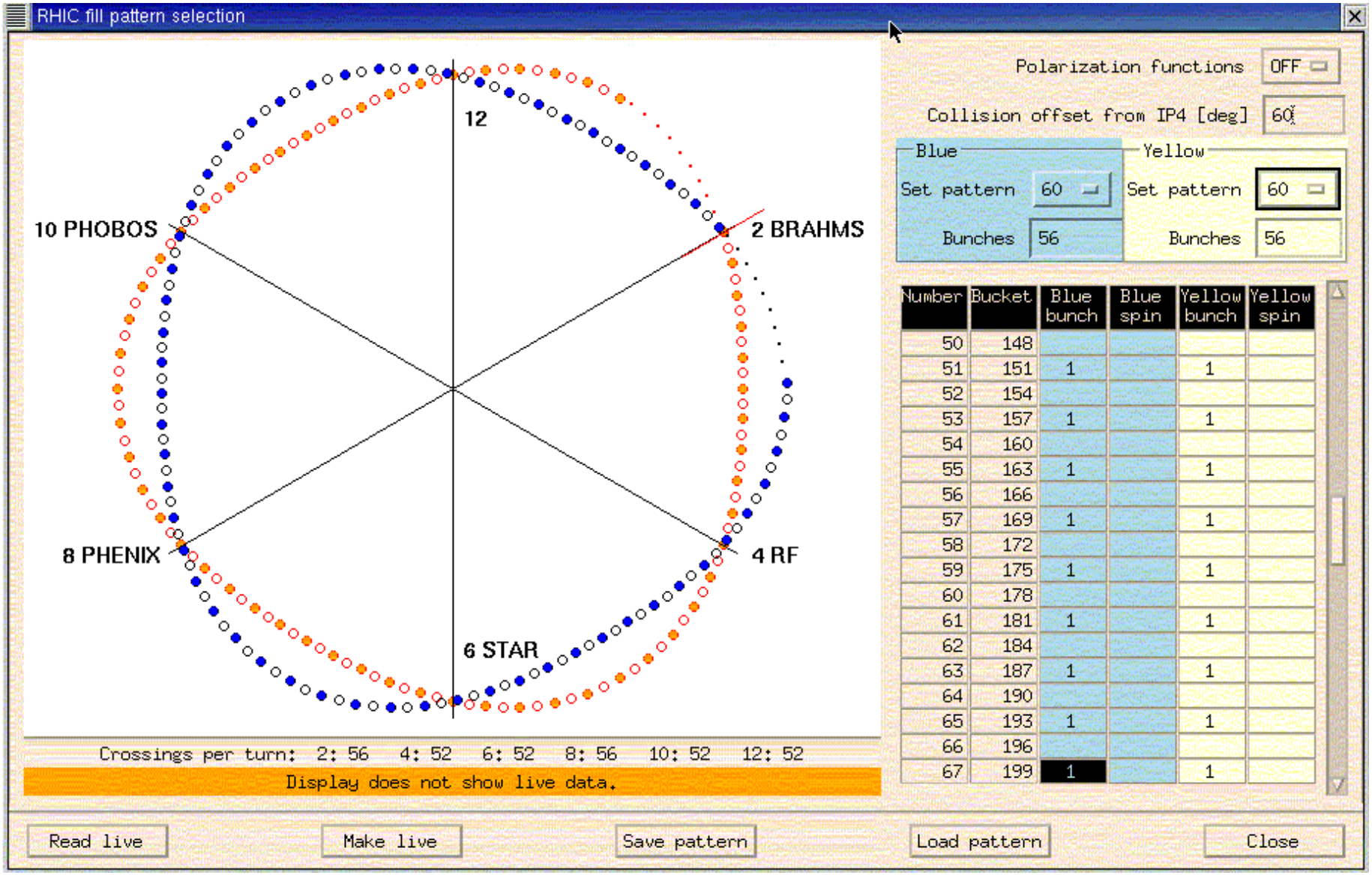
- Accelerated and collided 68x68 bunches (Mei, 0.5e9/bunch)
- Reduced dipole tracking error (Carl, Johannes)
- Tested ring-to-ring synchronization on ramp (MikeBr)
- Optics measurements at store (Mei, Todd)
- Measured effect of PHOBOS magnet (Todd, will be phased in)
- Decoupled at store, Blue ramp (Joanne, Fulvia, Todd, Christoph)
- Vernier scans (Angelika, Todd)
- Still needed before going into production:
  - **Storage RF system** (MikeBr, …)
  - **Gap cleaning** (Angelika, Rob, Tom)
  - **STAR magnet**

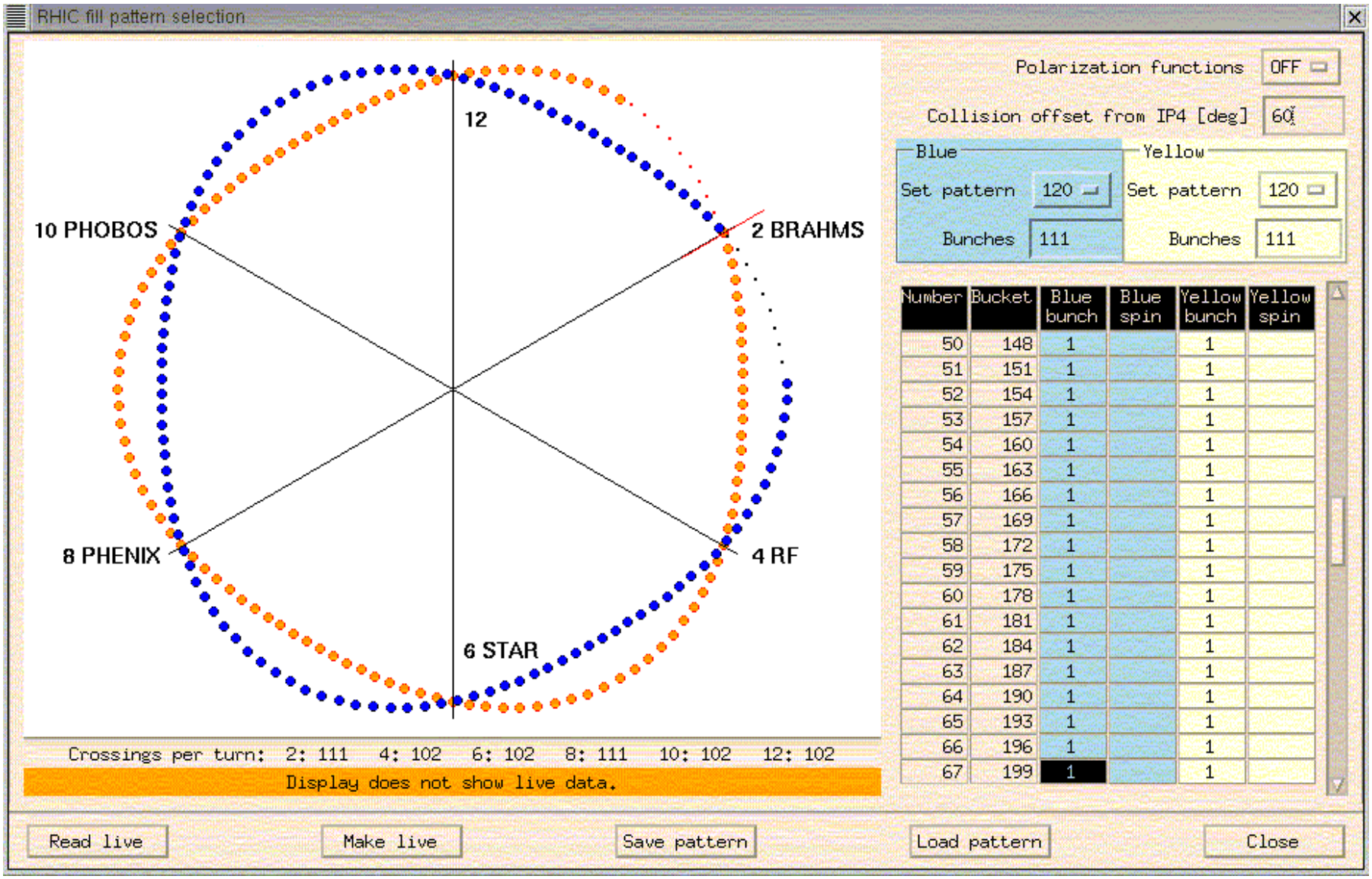
Rules for luminosity maximization

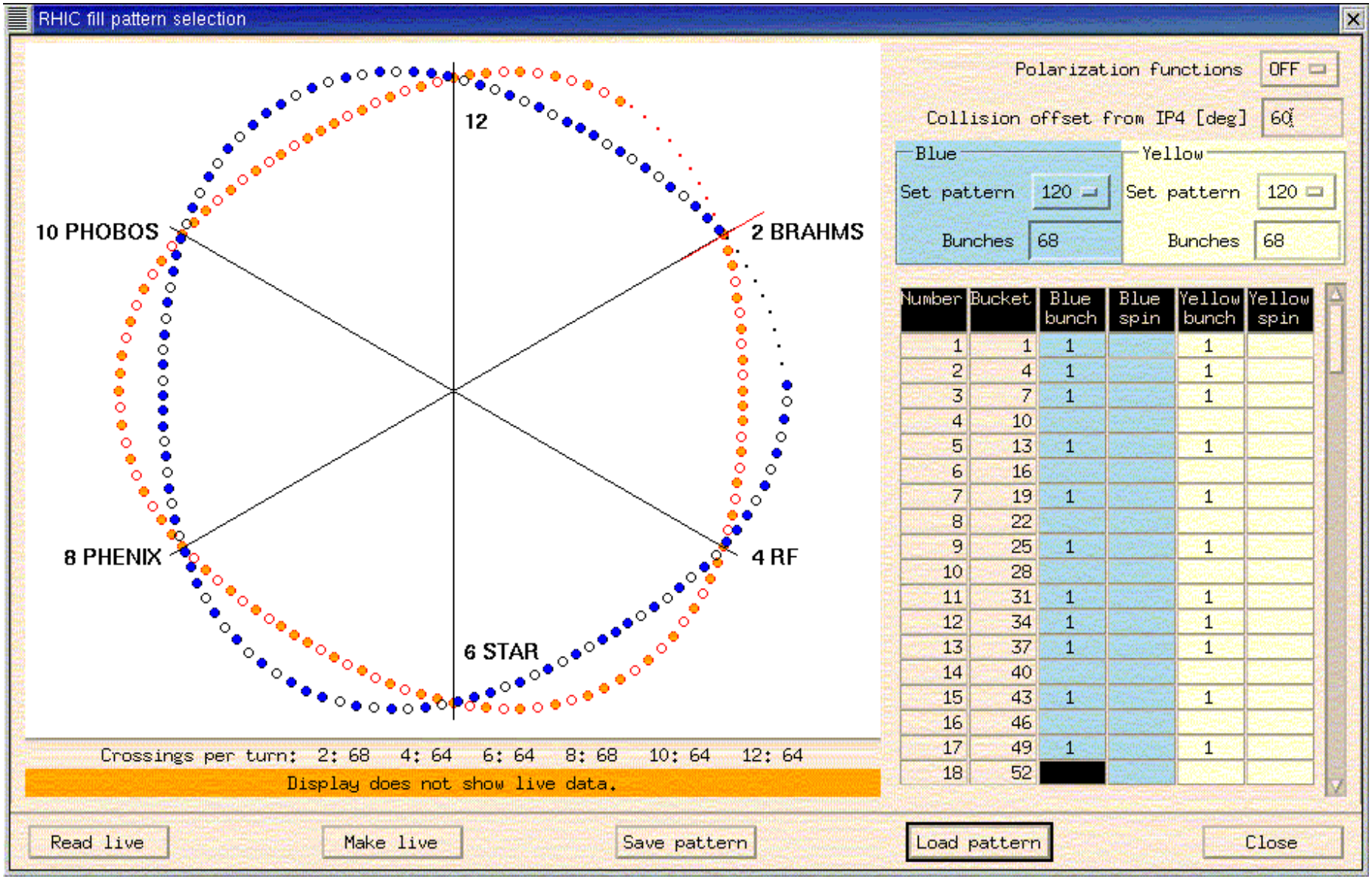
1. Maximize the bunch intensity first
   [the luminosity is proportional to the square of the bunch intensity]
2. Fill in as many bunches as possible second
   [the luminosity is proportional to the number of bunches]

Question arises of how to distribute N bunches in the ring. Answer:

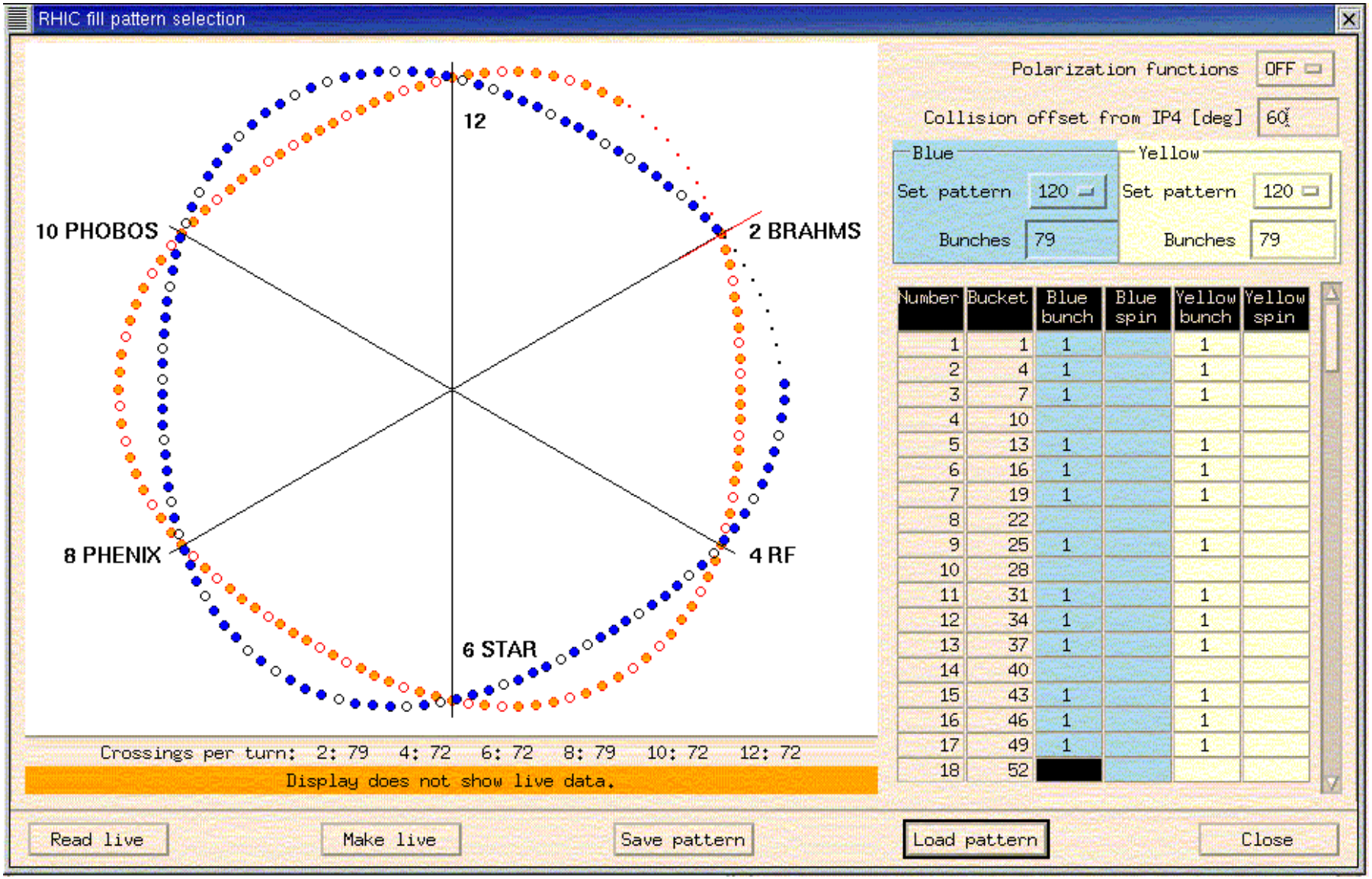
1. 3-fold symmetry to have about same number of collision in all experiments
2. Most uniform bunch distribution along circumference is best against e-cloud driven vacuum problems (RHIC tests, simulation, B-factory experience)


RHIC fill pattern selection
12
2 BRAHMS
4 RF
6 STAR
8 PHENIX
10 PHOBOS
Crossings per turn: 2: 56 4: 52 6: 52 8: 56 10: 52 12: 52
Display does not show live data.
Polarization functions OFF
Collision offset from IP4 [deg] 60
Blue
Set pattern 60
Bunches 56
Yellow
Set pattern 60
Bunches 56
Number Bucket Blue bunch Blue spin Yellow bunch Yellow spin
50 148
51 151 1 1
52 154
53 157 1 1
54 160
55 163 1 1
56 166
57 169 1 1
58 172
59 175 1 1
60 178
61 181 1 1
62 184
63 187 1 1
64 190
65 193 1 1
66 196
67 199 1 1
Read live
Make live
Save pattern
Load pattern
Close


RHIC fill pattern selection
12
2 BRAHMS
4 RF
6 STAR
8 PHENIX
10 PHOBOS
Polarization functions
OFF
Collision offset from IP4 [deg]
60
Blue
Set pattern
120
Bunches
111
Yellow
Set pattern
120
Bunches
111
Number
Bucket
Blue bunch
Blue spin
Yellow bunch
Yellow spin
50 148 1 1
51 151 1 1
52 154 1 1
53 157 1 1
54 160 1 1
55 163 1 1
56 166 1 1
57 169 1 1
58 172 1 1
59 175 1 1
60 178 1 1
61 181 1 1
62 184 1 1
63 187 1 1
64 190 1 1
65 193 1 1
66 196 1 1
67 199 1 1
Crossings per turn: 2: 111 4: 102 6: 102 8: 111 10: 102 12: 102
Display does not show live data.
Read live
Make live
Save pattern
Load pattern
Close



68 bunches, +20% lumi compared to 56



79 bunches, +40% lumi compared to 56

During production:

- Propose to have day shifts for machine development (~4 shifts per week)

1. Useful for maintaining good ramps and store conditions
2. Still many incremental improvements possible
   (beginning of store activities, collimation optimization, 4-bunch injection optimization, bunch intensity increases, transfer line efficiencies, rebucketing techniques, …)
3. Larger changes may be possible
   (bunch intensity increase from Booster bunch merge)

- Continue until no further luminosity increase possible or effort exceeds gain